

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
15 July 2004 (15.07.2004)

PCT

(10) International Publication Number
WO 2004/058328 A3

(51) International Patent Classification⁷: **G02B 6/06**
(21) International Application Number:
PCT/US2003/041095

(22) International Filing Date:
19 December 2003 (19.12.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/324,897 20 December 2002 (20.12.2002) US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:
US 10/324,897 (CIP)
Filed on 20 December 2002 (20.12.2002)

(71) Applicant (for all designated States except US): **TRIME-DYNE, INC.** [US/US]; 15091 Bake Parkway, Irvine, CA 92618 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **LOEB, Marvin, P.** [US/US]; 2872 Coast Circle, Apt. 101, Huntington Beach, CA 92649 (US).

(74) Agents: **CEPURITIS, Talivaldis et al.**; Olson & Hierl, Ltd., 20 North Wacker Drive, 36th Floor, Chicago, IL 60606 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

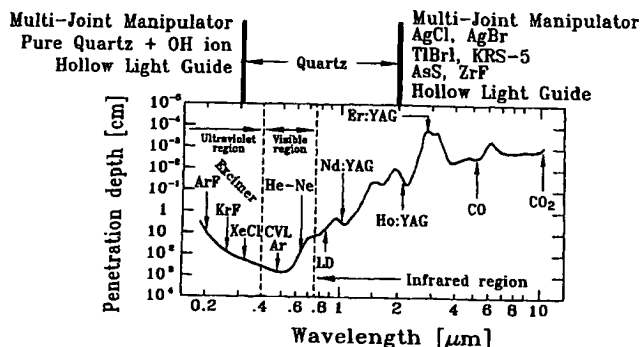
(84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: **DEVICE AND METHOD FOR DELIVERY OF LONG WAVELENGTH LASER ENERGY TO A TISSUE SITE**



(57) Abstract: A laser energy delivery device is provided that is suitable for irradiating a body tissue with relatively long wavelength laser energy in the presence of an aqueous liquid without significant absorption of the laser energy by the liquid. The device includes an elongate hollow sheath that has an open aperture at its distal end portion and closed at its proximal end, a laser energy conduit such as an optical fiber or hollow wave guide, within the sheath, the distal end of the conduit being disposed near the open aperture at the distal end portion of the sheath, and the proximal end of the conduit being adapted for connection to a source of long wavelength laser energy. The sheath also includes an inlet port, spaced from the proximal end of the sheath, and adapted to receive and deliver a biologically compatible gas through the sheath to a body tissue site in contact with the open distal end of the sheath. In use, the open aperture at the distal end portion of the sheath is positioned in contact with a body tissue site. Gas, such as carbon dioxide, infused through the sheath displaces an aqueous liquid from the region between the distal end portion of the sheath and the tissue. Laser energy emitted from the distal end portion of the conduit passes through the substantially liquid-free region at the distal end of the sheath and impinges on the tissue to be irradiated. The laser energy can be used to ablate, vaporize, coagulate or shrink tissue at the target zone without interference from aqueous liquids, which tend to absorb relatively large amounts of long wavelength laser energy and reduce the efficiency of tissue ablation.

WO 2004/058328 A3



(88) Date of publication of the international search report:

7 October 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/41095

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G02B 6/06

US CL : 385/117,123,125,126,127,115,116,12; 604/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 385/117,123,125,126,127,115,116,12; 604/24

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,352,221 A (FUMICH) 04 October 1994 (04.10.1994), see entire document.	1-37
A	US 5,470,330 A (GOLDENBERG et al.) 28 November 1995 (28.11.1995), see entire document.	1-37
A	US 6,182,666 B1 (DOBAK, III) 06 February 2001 (06.02.2001), see entire document.	1-37
A	US 6,451,012 B2 (DOBAK, III) 17 September 2002 (17.09.2002), see entire document.	1-37

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

30 July 2004 (30.07.2004)

Date of mailing of the international search report

09 AUG 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Brian M. Healy

Telephone No. 571-272-2800

INTERNATIONAL SEARCH REPORT

PCT/US03/41095

Continuation of B. FIELDS SEARCHED Item 3:

SEARCHED "EAST" (DATABASES INCLUDES USPAT, USPGPUB, EPO, JPO, DERWENT) search terms include: (optic\$ near fiber\$) and (tissue\$ near ablation\$) and laser\$ and (hollow\$ near sheath\$) and (gas\$ near laser\$)